

# **Clean-up Plan for Roanoke River**

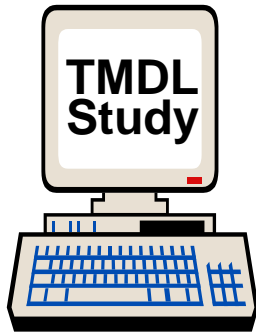
## **Agriculture/Residential Working Group Meeting**

**February 27, 2014**

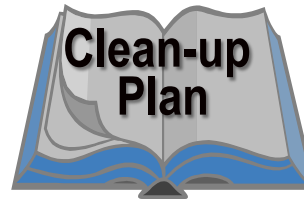
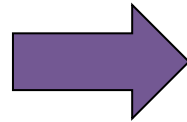


# Agenda

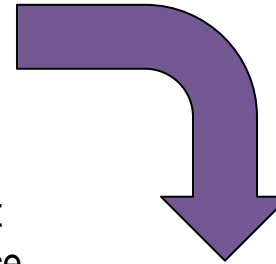
- TMDL and Clean-up Plan Process
- Watershed Overview
- TMDL Review
- Clean-up Plan Approach
- Clean-up Actions
- Units and Costs
- Funding



- Stressor Analysis
- ID pollutant sources
- Determine pollutant reductions



- Identify Best Management Practices (BMPs) to reduce pollutant levels
- Find \$\$\$ Sources

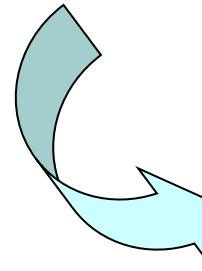
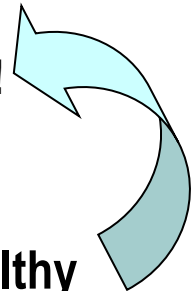


**Implement BMPs!**



**Healthy  
Aquatic Community**

Water quality  
standards met!



**The TMDL Process**

**Unhealthy  
Aquatic Community**

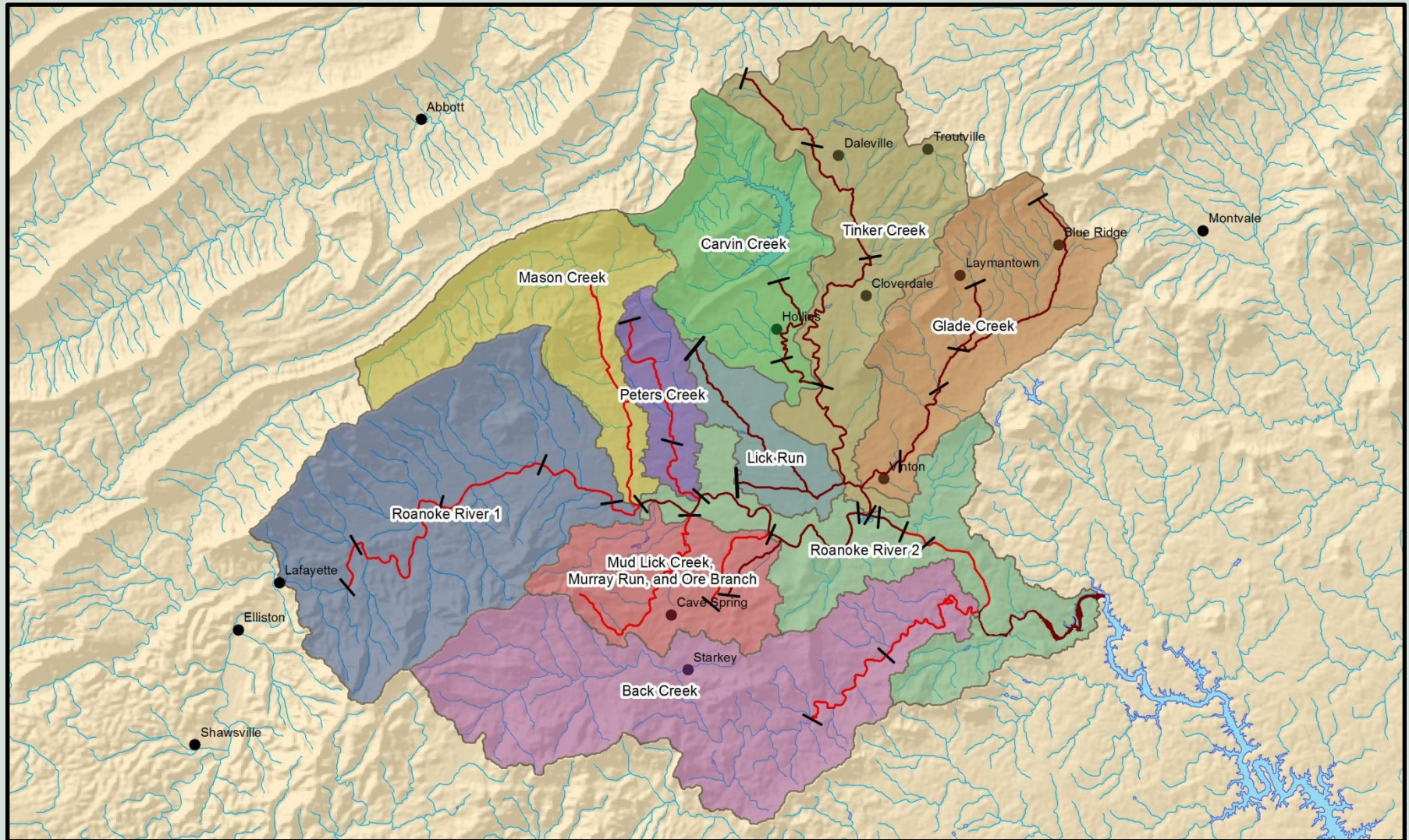
Water quality  
standards not met

# Adaptive Implementation Approach

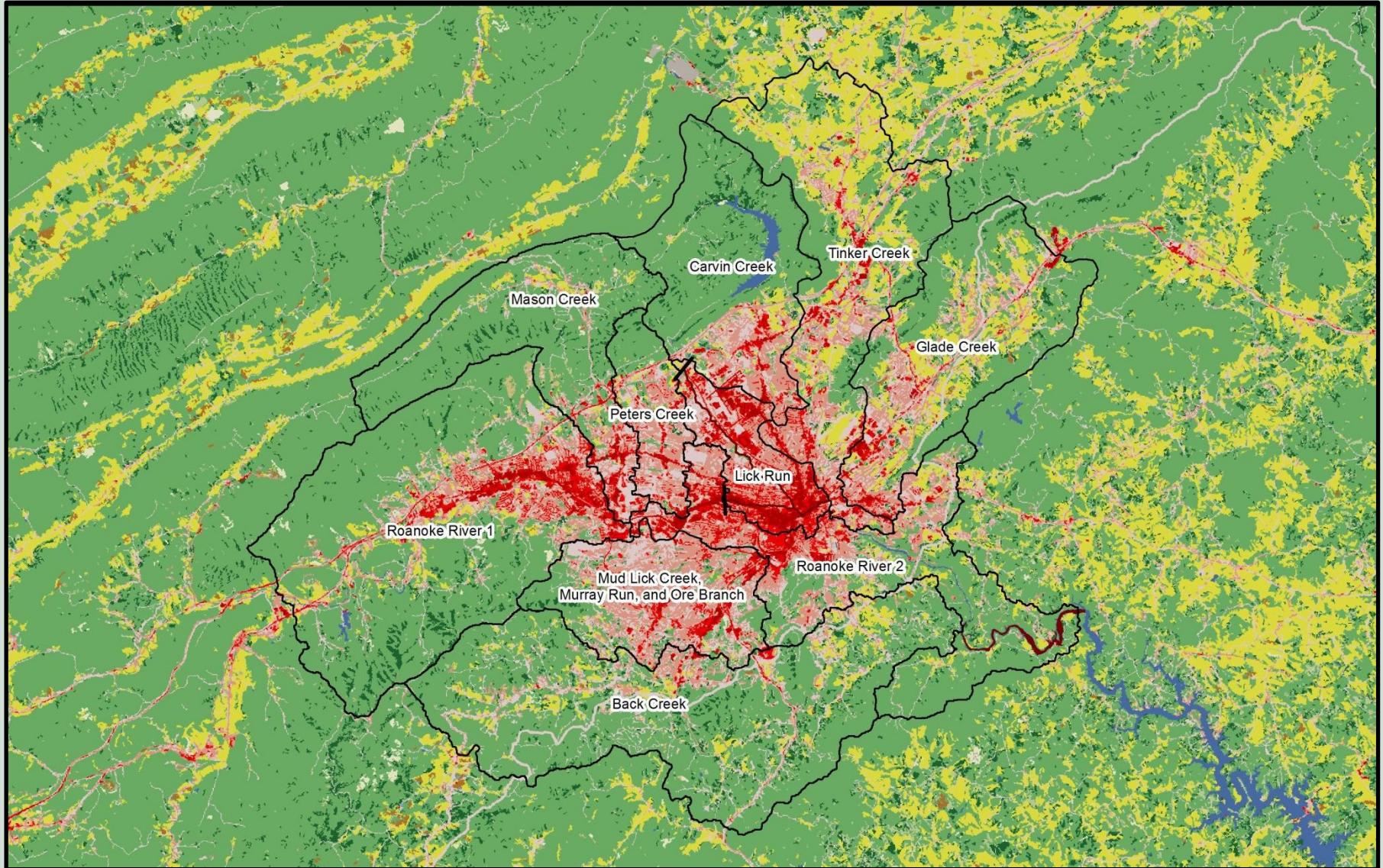
## Overarching Project Goal is to Design a Clean-up Plan including:

- Appropriate types and numbers of Best Management Practices designed to meet sediment and bacteria reduction goals called for in the Roanoke River watershed TMDL Reports
- Measurable Goals and Milestones for achieving water quality goals
- List and description of potential funding sources
- **Meeting Goals:** Discuss revised estimates of Best Management Practices by subwatershed that will result in reductions of residential and agricultural bacteria and sediment loads.

# Overview of the Watershed



# NLCD 2006 Landuse



# Landuse

Landuse Percentages by Subwatershed

Source	Carvin Creek	Glade Creek	Lick Run	Tinker Creek	Back Creek	Mason Creek	Mud Lick Creek, Murray Run, and Ore Branch	Peters Creek	Roanoke River 1	Roanoke River 2
Developed	23.27%	33.67%	97.43%	35.83%	18.36%	19.99%	73.63%	65.96%	13.59%	26.35%
Cropland	0.00%	0.32%	0.00%	0.11%	0.17%	0.05%	0.03%	0.00%	0.02%	0.001%
Pasture/Hay	2.98%	19.01%	0.89%	28.20%	7.54%	2.77%	1.41%	3.12%	0.87%	0.45%
Forest	69.56%	46.85%	1.65%	35.43%	73.28%	76.47%	24.64%	30.69%	84.64%	72.75%
Water/Wetlands	3.95%	0.10%	0.02%	0.20%	0.05%	0.02%	0.03%	0.00%	0.17%	0.39%
Other*	0.25%	0.05%	0.01%	0.23%	0.59%	0.70%	0.26%	0.23%	0.71%	0.06%

\*Includes Barren Land, Grassland/Herbaceous, Scrub/Shrub

# Roanoke River Watershed Allocations

TMDL Bacteria Reductions by Source

Source	Back Creek	Carvin Creek	Glade Creek	Lick Run	Mason Creek	Mud Lick Creek, Murray Run, and Ore Branch	Peters Creek	Roanoke River 1	Roanoke River 2	Tinker Creek
Developed	98.9%	90.2%	96.3%	98.5%	98.9%	99.6%	98.9%	96.5%	98.2%	98.6%
Cropland	98.9%	0.0%	96.3%	0.0%	98.9%	99.6%	0.0%	96.5%	98.2%	99.8%
Pasture/Hay	98.9%	90.2%	96.3%	91.0%	98.9%	99.6%	98.9%	96.5%	98.2%	99.8%
Forest	98.9%	85.2%	91.5%	0.0%	98.9%	99.6%	98.9%	96.5%	98.2%	95.0%
Water/Wetlands	0.0%	85.2%	91.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	95.0%
Other	98.9%	90.2%	96.3%	0.0%	98.9%	99.6%	98.9%	96.5%	98.2%	98.0%
Livestock Direct	100.0%	100.0%	100.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Wildlife Direct	64.5%	75.0%	70.0%	0.0%	65.1%	87.9%	53.7%	67.1%	66.0%	0.0%
Failing Septic Systems	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Roanoke River TMDL Sediment Reductions

Landuse Category		Percent Reduction
Land Sources	Developed	75%
	Cropland	75%
	Pasture/Hay	75%
	Forest	75%
	Water/Wetlands	0%
	Other	75%
Instream Erosion	-	75%

# Clean-up Plan Actions

- Indirect measures refers to outreach, educational programs, and signage.
- Indirect measures intend to change behaviors and attitudes of watershed citizenry through outreach and education. Several examples of indirect measures to be considered in this plan include:
  - Pet Waste Education Campaign
  - Pet Waste Signage
  - Outreach and Education of Agricultural BMPs

# Clean-up Plan Actions

- Refers to actions and installations that target pollutants at their source, and is a very cost-effective measure of reducing bacteria/sediment in stormwater
- The following are examples of preventative Best Management Practices (BMPs) being considered in the subwatersheds:
  - Proper Pet Waste disposal
    - Pet Waste Stations
    - Pet Waste Digesters
  - Livestock Exclusion Systems
  - Manure Storage
  - Residential Waste Treatment BMPs

# Clean-up Plan Actions

- Refers to actions and installations that intercept pollutants before they reach our waterways
- The following are examples of Best Management Practices (BMPs) being considered in the subwatersheds:
  - Continuous No-Till
  - Cover Crops
  - Raingardens

# Residential BMPs

## Pet Waste

- Pet Waste Stations
  - Proposed one station every two miles of residential road
- Pet Waste Digester/Composter
- Educational Campaign
  - Proposed one campaign per subwatershed

## Stormwater

- Raingardens



# Residential BMPs

## Sewage Disposal

- **Septic System Pump out (RB-1)**
  - 10% of All Septic Systems
- **Sewer Connection (RB-2)**
  - Targeted Approach based on VDH consultation
- **Repaired Septic System (RB-3)**
  - All Failing Septic Systems for houses built after 1964
- **Septic System Installation/Replacement (RB-4)**
  - All Failing Septic Systems for houses built before 1964
- **Alternative Waste Treatment System Installation (RB-5)**
  - 5% of all failing septic systems



# Agricultural BMPs

## Livestock Exclusion and Manure Management

- CREP Livestock Exclusion (CRSL-6)
- Livestock Exclusion with Grazing Land Management (SL-6T)
- Small Acreage Grazing Systems (SL-6A)
- Livestock Exclusion with Riparian Buffers (LE-1T)
- Livestock Exclusion with Reduced Setback (LE-2T)
- Stream Protection/Fencing (WP-2T)
- Manure Storage (WP-4)



# Agricultural BMPs

## Pasture

- Vegetative Cover on Critical Areas (SL-11)
  - 10-20% of Pastureland
- Reforestation of Erodible Pasture (FR-1)
  - 5-10% of Pastureland
- Pasture Management (EQIP 528, SL-10T)
  - Remainder of Pastureland



# Agricultural BMPs

## Cropland

- Continuous No-Till (SL-15)
- Small Grain Cover Crop (SL-8)
- Permanent Vegetative Cover on Cropland (SL-1)
- Sod Waterways (WP-3)



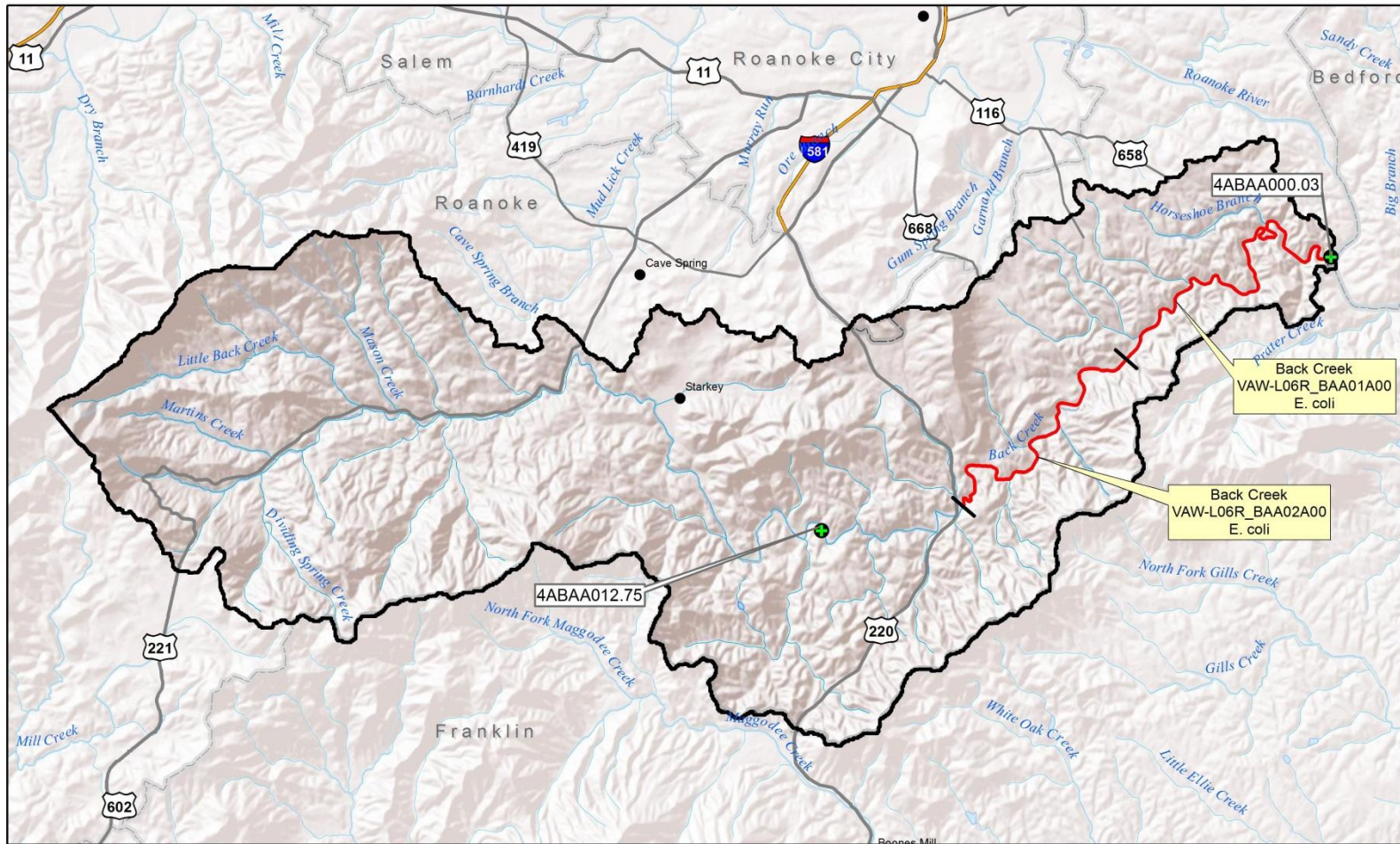
# Residential BMPs

Residential BMPs	Sediment Removal Efficiency	Bacteria Removal Efficiency
Pet Waste		
Educational Campaign	NA	25%
Pet Waste Stations	NA	NA
Residential Waste		
Total Septic Pumpout (RB-1)	NA	5%
Sewer Connection (RB-2)	NA	100%
Total Septic Repair (RB-3)	NA	100%
Total Septic Install/Replace (RB-4)	NA	100%
Total Alternative Waste Treatment System (RB-5)	NA	100%

# Agricultural BMPs

Agricultural BMPs	Sediment Removal Efficiency	Bacteria Removal Efficiency
Cropland		
Continuous No-Till (SL-15)	70%	70%
Small Grain Cover Crop (SL-8)	20%	20%
Permanent Vegetative Cover on Cropland (SL-1)	75%	75%
Sod Waterways (WP-3)	50%	50%
Cropland Buffers (CP-33 and WQ-1)	50%	50%
Livestock Exclusion System and Manure Management		
CREP Livestock Exclusion (CRSL-6)	56%	100%
Livestock Exclusion (SL-6T/LE-1T)	56%	100%
Livestock Exclusion w/ Reduced Setback (LE-2T)	56%	100%
Small Acreage Grazing System (SL-6AT)	56%	100%
Stream Protection/Fencing (WP-2T)	56%	100%
Manure Storage (WP-4) - Dairy	NA	80%
Manure Storage (WP-4) - Beef	NA	80%
Pasture		
Vegetative Cover on Critical Areas (SL-11)	75%	75%
Reforestation of Erodible Pasture (FR-1)	LU Conversion	LU Conversion
Pasture Management (EQIP 528, SL-10T)	30%	50%

# Back Creek Subwatershed



# Back Creek Subwatershed

Residential BMPs	Units	Cost/unit	Total Cost
Pet Waste			
Educational Campaign	1	\$3,750	\$3,750
Pet Waste Stations	102	\$170	\$17,312
Residential Waste			
Total Septic Pumpout (RB-1)	432	\$300	\$129,665
Sewer Connection (RB-2)	94	\$10,000	\$940,000
Total Septic Repair (RB-3)	328	\$3,600	\$1,181,729
Total Septic Install/Replace (RB-4)	352	\$6,000	\$2,111,018
Total Alternative Waste Treatment System (RB-5)	34	\$16,000	\$539,407

# Back Creek Subwatershed

Agricultural BMPs	Units	Cost Basis	Cost/unit	Total Cost
Cropland				
Continuous No-Till (SL-15)	62.6	Acres	\$100	\$6,265
Small Grain Cover Crop (SL-8)	62.6	Acres	\$30	\$1,879
Permanent Vegetative Cover on Cropland (SL-1)	0.0	Acres	\$175	\$0
Sod Waterways (WP-3)	0.0	Acres	\$1,600	\$0
Cropland Buffers (CP-33 and WQ-1)	0.0	Acres	\$600	\$0
Livestock Exclusion System				
CREP Livestock Exclusion (CRSL-6)	0.0	System	\$27,000	\$0
Livestock Exclusion (SL-6T/LE-1T)	34.7	System	\$21,000	\$729,069
Livestock Exclusion w/ Reduced Setback (LE-2T)	3.6	System	\$17,000	\$60,561
Small Acreage Grazing System (SL-6AT)	2.0	System	\$9,000	\$18,380
Stream Protection/Fencing (WP-2T)	1.0	System	\$5,000	\$21,322
Manure Storage (WP-4) - Dairy	6	System	\$100,000	\$646,671
Manure Storage (WP-4) - Beef	6	System	\$58,000	\$375,069
Pasture				
Vegetative Cover on Critical Areas (SL-11)	269	Acres	\$1,200	\$323,336
Reforestation of Erodible Pasture (FR-1)	142	Acres	\$560	\$79,416
Pasture Management (EQIP 528, SL-10T)	2,694	Acres	\$75	\$202,085

# Additional Implementation Measures/BMPs for Consideration

## Residential

- Pet waste digesters
- Watershed area signage medallions “*No Dumping – Drains to Waterway*”
- Vegetated swale
- “Pearl Homes”
- Any other BMP opportunities?

## Agricultural

- Stream bank stabilization (WP-2A)
- Equine manure storage facilities
- Any other BMP opportunities?

# Funding Sources

- USDA Programs – Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP), Environmental Quality Incentives Program (EQIP)
- EPA Section 319 Funds
- Water Quality Improvement Fund
- State Revolving Loan Funds
- State Cost-Share Program
- State Tax Credits
- Agricultural Best Management Practices Loan Program
- VA Small Business Environmental Assistance Fund Load Program
- Community Development Block Grant Program
- Southeast Rural Community Assistance Program (SER-CAP)
- Wetland Reserve Program (WRP)

# TMDL Contacts



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**Reports/presentations available at:**

**<http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/TMDL/TMDLImplementation/TMDLImplementationProgress.aspx>**

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